reflection". Also, "decentered" on page 8, line 22 has been amended to recite "moved". Also, "113" on page 18, lines 12 and 13 has been amended to recite "113a". It is respectfully requested that the Examiner approve these amendments when acting on this amendment.

Claim 22 was rejected under 35 USC 103(a) as being unpatentable over Horikawa in view of Arimoto et al., and Matsuyama (U.S. Patent No. 6,292,279 B1). This rejection is now moot in view of the cancellation of claim 22.

Claims 1-3, 7-9, 11-13, 17-19 and 21 were rejected under 35 USC 103(a) as being unpatentable over Horikawa (U.S. Patent No. 4,978,197) in view of Arimoto et al. (U.S. Patent No. 4,806,951). The Examiner believed that Horikawa disclosed a beam-combining laser beam source device, which included at least two laser light sources (first laser beam source section 3A-3E and second laser beam source section 3F-3J) for oscillating and emitting at least two laser beams having different wavelengths, an optical path adjusting system for adjusting optical paths (col. 3, lines 5-8), which comprises a first adjuster (prism mirrors 5 positioned n the optical paths of laser beams 3a-3e for adjusting the optical path of the first laser beam section), a second adjuster (prism mirrors 5 positioned in the optical paths of laser beams 3f-3j for adjusting the optical path of the second laser beam section).

The Examiner also believed that Horikawa further taught including a position sensor for monitoring whether the laser beams are converged to the predetermined positions (col. 8, line 2-21). The Examiner further believed that Horikawa also suggested the device being used in light beam scanning apparatuses, which include an optical scanning system (light deflector) for scanning the laser beams on a predetermined scanning plane (col. 1, lines 17-21).

The Examiner also stated that Horikawa failed to teach the position sensor being disposed on a plane optically conjugated with the predetermined scanning plane, a beam splitter for splitting the laser beams toward the scanning plane and the position sensor directions, the adjusters being positioned between the laser light sources and a polygon mirror, the adjusters including actuators for adjusting a reflection angle of the adjusters, the calculating means, and the mirrors being rotatable in two different axes. The Examiner then relied on Arimoto et al. for these features.

This rejection is respectfully traversed in view of the amendments to the claims and the following remarks.

The present invention relates to providing a laser beam scanner and a photographic printer using the scanner, wherein the optical paths of the laser beams can be adjusted without using a

measuring instrument disposed on a scanning line on which the laser beams are to be scanned.

The laser beam scanner 100 comprises three laser light sources 104R, 104G and 104B respectively corresponding to the three principal colors of red, green and blue. The laser beam scanner 100 also comprises a collimator lens 106, an acousto-optic modulator 108, three adjustable mirrors 110, optical paths 105, a polygon mirror 120, a fθ lens 121, a cylindrical lens 122, a pair of mirrors 124 and 126, a wall 130 and housing 102.

Horizontal positions of the laser light sources 104R, 104G and 104B are adjusted with respect to standard points provided on the housing 102. Vertical position of the laser light sources 104R, 104G and 104B are adjusted by using shims. Furthermore, each adjustable mirror 110 can be rotated around a vertical axis for adjusting the reflection angle of the laser beam.

The optical paths 105 in the laser beam scanner 100 and monitoring system for monitoring the position of the reflected laser beams by the adjustable mirrors 110 is shown in Fig. 4. A position sensor 201 such as a two-dimensional position sensitive detector (PSD) is disposed at a position or on a plane P2 conjugating with a standard position on the scanning line or a scanning plane P1 on a surface of a photographic paper sheet 1 conveyed by the conveyor.

In the photographic printer, it is important that the scanning lines of the laser beams on the photographic paper sheet 1 are overlapped. Thus, the adjustment of the optical paths of the laser beams is executed so that the red laser beam and the blue laser beam are to be overlapped on the green laser beam.

As can be seen from Fig. 5, the positions designated by symbols R and G coincide, so that the red laser beam can be overlapped on the scanning line or position of the green laser beam. The position designated by symbol B is discrepant from the positions designated by symbols R and G, so that the blue laser beam cannot be overlapped on the scanning line or position of the green laser beam. When the discrepancy of the positions is not acceptable, this causes the occurrence of bleeding in color development when the exposed photographic paper 1 is developed. Thus, the adjustable mirror 110 and the laser light source 104B corresponding to the blue laser beam are adjusted in a manner so that the position of blue laser beam designated by symbol B moves to approach the positions of red and green laser beams designated by symbols R and G along arrow F in Fig. 5.

Claim 1 and claims 11, 23 and 24 (which are fairly similar to claim 1) have been amended to recite that "a laser beam scanner comprising: a first laser light source for oscillating and emitting a red laser beam; a second laser light source for

oscillating and emitting a green laser beam; a third laser light source for oscillating and emitting a blue laser beam", "an optical scanning system for scanning the laser beams on a predetermined scanning plane coinciding with a surface of a photographic paper when being conveyed thereto" and "a position sensor disposed on a plane optically conjugated with a plane corresponding to the photographic paper at the predetermined scanning plane, and a first adjuster for adjusting an optical path of the first laser beam; and a second adjuster for adjusting an optical path of the second laser beam, and a third adjuster for adjusting an optical path of the third laser beam." Claim 21 (that is similar to claims 1 and 11) has been amended as discussed above and has been further amended to recite that "said third adjuster is a mirror provided in the optical scanning system and rotatable around two different axes for adjusting a reflection angle of the third laser beam."

Horikawa relates to a beam-combining laser beam source device. Horikawa discloses that a beam-combining laser beam source device 1 comprises ten semiconductor lasers 3A through 3J, ten concave lenses 4, ten prism mirrors 5, convex lenses 6, laser beams 3a thought 3j, mirror 8, a half wave plate 9, a polarization beam splitter 7 and convex lenses 11 and 12. In this embodiment, a first laser beam source section 10 is

constituted of the semiconductor lasers 3A through 3E. A second laser beam source section 20 comprises the semiconductor lasers 3F through 3J. In the first laser beam source section 10 which has been radiated from the second laser beam source section 20, it is necessary to control the positions of the laser beams 3a through 3j and the points at which the laser beams 3a through 3j are focused so that all laser beams 3a through 3j are collimated and the laser beams 3a through 3e and the laser beams 3f through 3j respectively overlap one upon the other. Horikawa also discloses that the adjustment of the positions of the laser beams, which have been radiated from the first laser beam source section and the second laser beam source section, in the other of the two directions normal to each other in the optical paths of the laser beams, which have been combined, can be achieved by the movement of the other common lens along its second direction normal to the optical axis. Therefore, it is only necessary that each common lens be moved in two directions, and the positions of the laser beams can be adjusted very easily with movement means which are cheap and simple.

The Examiner has admitted that Horikawa does not include many of the claimed features including the position sensor being disposed on a plane optically conjugated with the predetermined scanning plane, a beam splitter for splitting the laser beams

toward the scanning plane and the position sensor directions, the adjusters being positioned between the laser light sources and a polygon mirror, the adjusters including actuators for adjusting a reflection angle of the adjusters, the calculating means and the mirrors being rotatable in two different axes.

Horikawa also does not disclose that a first laser light source for oscillating and emitting a red laser beam; a second laser light source for oscillating and emitting a green laser beam; a third laser light source for oscillating and emitting a blue laser beam.

Arimoto et al. does not make up for the deficiencies in Horikawa. Arimoto et al. relate to an optical printer. Arimoto et al. disclose that the laser beams 21, 22 emitted from two lasers 11, 12 are introduced in substantially the same direction by a prism 10 to an optical system shown in Fig. 2 and consisting of a rotating polygonal mirror 5 and a Fθ lens 6. Reference numerals 91, 92 denote known actuators, and 41, 42 are known controllers for controlling these actuators.

Arimoto et al. also disclose a photodetectors A_1-A_4 and photodetectors 81, 82 are placed in a position outside the print span and at the end of a surface to be scanned with the laser beams, and which border each other in the primary scanning direction. The position in which the photodetectors A_1-A_4 are

disposed and a surface (the surface of a photosensitive drum 200 to which the light is applied) to be scanned have geometrooptically conjugate image forming relation with respect to the sub-scanning direction. Accordingly, the ratio of the distance between two scanning lines on the surface to be scanned to the diameter of the condensed spots in the sub-scanning direction becomes equal to that of the distance between two laser spots on the surfaces of the photodetectors A1-A4 to the diameter of the spots. Therefore, the positions may be detected on the surfaces of the photodetectors A1-A4 instead of setting two scanning lines on the surface to be scanned, in such a manner that the scanning lines are spaced by a predetermined distance (see column 7, lines 9-41).

However, Arimoto et al. do not disclose or suggest that an optical scanning system for scanning the laser beams on a predetermined scanning plane coinciding with a surface of a photographic paper when being conveyed thereto. Arimoto et al. also do not disclose or suggest that a position sensor disposed on a plane optically conjugated with a plane corresponding to the photographic paper at the predetermined scanning plane, and a first adjuster for adjusting an optical path of the first laser beam; and a second adjuster for adjusting an optical path of the

second laser beam, and a third adjuster for adjusting an optical path of the third laser beam.

It is therefore respectfully submitted that both Horikawa and Arimoto et al. do not disclose or suggest the presently claimed invention and it would not have been obvious to one of ordinary skill in the art to combine these references to render the present claims obvious. Accordingly, claims 1, 11 and 21 clearly define over the prior art of record and should be allowed.

Claims 4, 14, 23, 24 were rejected under 35 USC 103(a) as being unpatentable over Horikawa in view of Arimoto et al. as applied to claims 1 and 11 above, and further in view of Uemura et al. (U.S. Patent No. 5,436,645). Further, dependent claims 5, 6, 15 and 16 were rejected under 35 USC 103(a) as being unpatentable over Horikawa in view of Arimoto et al., as applied to claims 1 and 11 above, and further in view of Ackerman (U.S. Patent No. 4,560,244). Additionally, dependent claims 10 and 20 were rejected under 35 USC 103(a) as being unpatentable over Horikawa in view of Arimoto et al. as applied to claims 1 and 11 above, and further in view of Suzuki (JP 2-236538). Applicant submits that these claims are all allowable in view of the amendments that have been made to independent claims 1, 11, 21, 23 and 24 as discussed above.

New claim 25 has been added to this application. New claim 25 is similar to original claim 1 and further includes the feature that the positions of the laser beams can be adjusted to overlap at a certain point on the predetermined scanning plane. This claim is supported by page 13, lines 12-25 of the specification.

Applicant respectfully submits that this claim also defines over the prior art of record and allowance of these claims is respectfully requested.

In summary, applicant respectfully submits that the application is now in condition for allowance and an action to this effect is respectfully requested.

If there are any questions or concerns regarding the amendments or these remarks, the Examiner is requested to telephone the undersigned at the telephone number listed below.

Respectfully submitted,

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Reg. No. 32,548

Date: February 6, 2003

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

Submitted herewith is a marked-up version of the amended claims to show changes made in the foregoing Amendment.

IN THE SPECIFICATION

Please substitute the paragraph beginning at page 6, line 14 and ending at page 7, line 2 to read as follows:

-- Detailed configuration of the laser beam scanner 100 used for exposing the photographic paper sheet is shown in FIG. 2. The laser beam scanner 100 comprises three laser light sources 104R, [10G] 104G and 104B respectively corresponding to three principal colors of red, green and blue. The laser light cource 104R includes a semiconductor laser for emitting a red laser beam having a wavelength of 680 nm. The laser light source 104G includes the semiconductor laser and a wavelength converting device for concerting the laser beam emitted form the semiconductor laser to a green laser beam having a wavelength of 532 nm. The laser light source 104B includes the semiconductor laser and a wavelength converting device for converting the laser

beam emitted from the semiconductor laser to a blue laser beam having a wavelength of 473 nm. --

Please substitute the paragraph beginning at page 8, line 6 and ending at page 8, line 11 to read as follows:

-- Horizontal positions of the laser light sources 104R, 104G and 104B are adjusted with respect to standard points provided on the housing 102. Vertical positions of the laser light sources 104R, [10G] <u>104G</u> and 104B are adjusted by using shims. Furthermore, each adjustable mirror 110 can be rotated around a vertical axis for adjusting the reflection angle of the laser beam. --

Please substitute the paragraph beginning at page 8, line 12 and ending at page 8, line 23 to read as follows:

-- Detailed configuration of the adjustable mirror 110 is shown in FIG. 3. In FIG. 3, the direction shown by arrow P corresponds to the vertical direction, and the directions shown by arrows R and Q correspond to the horizontal directions. In FIG. 3, [the] <u>a</u> reflection surface M1 of a mirror body 112 is illustrated to be the top face, intelligibly. A mirror holder 11

has three side walls 111a, 111b and 111c perpendicular to a deck 111d for holding the mirror body 112. A shaft 113 is borne by bearings 119a and 119b provided on the side walls 111b and 111c. The mirror body 112 is rotatably pivoted on the mirror holder 111 by the shaft 113. The position of the shaft 113 is [decentered] moved toward a side face M4 from the center of side faces M2 and M3 of the mirror body 112. --

Please substitute the paragraph beginning at page 18, line 9 and ending at page 18, line 20 to read as follows:

-- A modification of the adjustable mirror 110 is described with reference to FIG. 7. In this modification, the angle of the reflection surface of the mirror body 112 can be adjusted by an actuator 300 such as a motor. The shaft [113] 113a penetrates the side wall 111b and a gear 301 is fixed on the end of the shaft [113] 113a. A pinion 302 fixed on a shaft of the actuator 300 is engaged with the gear 301. A spring 303 is provided between the rear face M6 of the mirror body 112 and the deck 111d of the mirror holder 111 for canceling backlash of the gear 301 and the pinion 302. The force of the spring 303 is to be underpowered than the magnetic resistance of the actuator 300 so as not to rotate the mirror body 112. The elements designated by

the same numeral or symbol are substantially the same as those in FIG. 3. --

IN THE CLAIMS

Claims 1, 11, 21 and 23-24 have been amended as follows:

-- 1. (Twice Amended) A laser beam scanner comprising:

[at least two laser light sources for oscillating and emitting a first laser beam and a second laser beam having different wavelengths] a first laser light source for oscillating and emitting a red laser beam;

a second laser light source for oscillating and emitting a green laser beam;

a third laser light source for oscillating and emitting a blue laser beam;

an optical scanning system for scanning the laser beams on a predetermined scanning plane coinciding with a surface of a photographic paper when being conveyed thereto; and

an optical path adjusting system for adjusting optical paths of the optical scanning system, including:

a position sensor disposed on a plane optically conjugated with [the predetermined scanning plane] a plane

corresponding to the photographic paper at the predetermined scanning plane, and

a first adjuster for adjusting an optical path of the first laser beam; and

a second adjuster for adjusting an optical path of the second laser beam, and

a third adjuster for adjusting an optical path of the third laser beam. --

-- 11. (Twice Amended) A photographic printer including a laser beam scanner, a conveyor for conveying a photographic paper to a predetermined scanning plane of the laser beam scanner and a developer for developing a latent image exposed on the photographic paper by the laser beam scanner; wherein the laser beam scanner comprising:

[at least two laser light sources for oscillating and emitting a first laser beam and a second laser beam having different wavelengths] a first laser light source for oscillating and emitting a red laser beam;

a second laser light source for oscillating and emitting a green laser beam;

a third laser light source for oscillating and emitting a blue laser beam;;

an optical scanning system for scanning the laser beams on the predetermined scanning plane coinciding with a surface of a photographic paper when being conveyed thereto; and

an optical paths adjusting system for adjusting optical paths of the optical scanning system, including:

a position sensor disposed on a plane optically conjugated with [the predetermined scanning plane] a plane corresponding to the photographic paper at the predetermined scanning plane, and

a first adjuster for adjusting an optical path of the first laser beam; and

a second adjuster for adjusting an optical path of the second laser beam, and

a third adjuster for adjusting an optical path of the third laser beam. --

-- 21. (Amended) A laser beam scanner comprising:

[at least two laser light sources for oscillating and emitting a first laser beam and a second laser beam having different wavelengths] a first laser light source for oscillating and emitting a red laser beam;

a second laser light source for oscillating and emitting a green laser beam;

a third laser light source for oscillating and emitting a blue laser beam;

an optical scanning system for scanning the laser beams on a predetermined scanning plane coinciding with a surface of a photographic paper when being conveyed thereto; and

an optical path adjusting system for adjusting optical paths of the optical scanning system, including:

a position sensor disposed on a plane optically conjugated with [the predetermined scanning plane] a plane corresponding to the photographic paper at the predetermined scanning plane, and

a first adjuster for adjusting an optical path of the first laser beam and a second adjuster for adjusting an optical path of the second laser beam and a third adjuster for adjusting an optical path of the third laser beam, wherein said first adjuster is a mirror provided in the optical scanning system and rotatable around two different axes for adjusting a reflection angle of the first laser beam and said second adjuster is a mirror provided in the optical scanning system and rotatable around two different axes for adjusting a reflection angle of the second laser beam and said third adjuster is a mirror provided in the optical scanning system and rotatable around two different

axes for adjusting a reflection angle of the third laser beam. --

-- 23. (Amended) A laser beam scanner comprising:

[at least two laser light sources for oscillating and emitting a first laser beam and a second laser beam having different wavelengths] a first laser light source for oscillating and emitting a red laser beam;

a second laser light source for oscillating and emitting a green laser beam;

a third laser light source for oscillating and emitting a blue laser beam;

an optical scanning system for scanning the laser beams on a predetermined scanning plane coinciding with a surface of a photographic paper when being conveyed thereto; and

an optical path adjusting system for adjusting optical paths of the optical scanning system, including:

a position sensor disposed on a plane optically conjugated with [the predetermined scanning plane] a plane corresponding to the photographic paper at the predetermined scanning plane, and

a first adjuster for adjusting an optical path of the first laser beam; and

a second adjuster for adjusting an optical path of the second laser beam; and

a third adjuster for adjusting an optical path of the third laser beam, and

a monitor display for displaying images corresponding to the relative positions of the first laser beam and the second laser beam on the position sensor and said monitor display is detachable from the optical path system.

24. (Amended) A laser beam scanner comprising:

[at least two laser light sources for oscillating and emitting a first laser beam and a second laser beam having different wavelengths] a first laser light source for oscillating and emitting a red laser beam;

a second laser light source for oscillating and emitting a green laser beam;

a third laser light source for oscillating and emitting a blue laser beam;

an optical scanning system for scanning the laser beams on a predetermined scanning plane coinciding with a surface of a photographic paper when being conveyed thereto; and

an optical path adjusting system for adjusting optical paths of the optical scanning system, including:

a position sensor disposed on a plane optically conjugated with [the predetermined scanning plane] a plane corresponding to the photographic paper at the predetermined scanning plane, and

a first adjuster for adjusting an optical path of the first laser beam; and

a second adjuster for adjusting an optical path of the second laser beam; and

a third adjuster for adjusting an optical path of the third laser beam, and

a monitor display for displaying images corresponding to the relative positions of the first laser beam and the second laser beam on the position sensor. --

US 4978197 A

TITLE: Beam-combining laser beam source device

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Abstract Text - ABTX (1):

A beam-combining laser beam source device comprising first and second laser beam source sections, each of which includes laser beam sources, a collimator optical system and optical path adjusting elements, and a beam-combining optical element. Each collimator optical system is constituted of lens groups corresponding to the laser beam sources, and a common lens positioned so that the laser beams, which have been radiated from the optical path adjusting elements along optical paths parallel and close to one another, impinge upon the common lens. The common lenses are moveable along first directions parallel to their optical axes and along second directions normal to the optical axes. The laser beams which have been radiated from the first laser beam source section and those radiated from the second laser beam source section are moved along directions normal to each other in the optical paths of the laser beams, which have been combined by the movement of the common lenses of the first and second laser beam source sections along the second directions.

Brief Summary Text - BSTX (18):

(iii) optical path adjusting elements respectively positioned in the optical paths of the laser beams in order to radiate the laser beams along optical paths parallel and close to one another,

Brief Summary Text - BSTX (20):

wherein each of said collimator optical systems of said first laser beam source section and said second laser beam source section is constituted of lens groups, each of which is composed of a plurality of lenses corresponding to each of said laser beam sources, and a common lens positioned so that the laser beams, which have been radiated from said optical path adjusting elements along the optical paths parallel and close to one another, impinge upon said common lens,

Brief Summary Text - BSTX (24):

The term "combining laser beams" as used herein means that a plurality of collimated laser beams are combined parallel and close to one another so that they can impinge upon a single converging lens or the like. In cases where the direction in which the laser beams radiated from the first laser beam source section are polarized and the direction in which the laser beams radiated from the second laser beam source section are polarized are normal to each other, a polarization beam splitter is used as the beam-combining optical element. In cases where the wavelengths of the laser beams radiated from the first laser beam source section and the wavelengths of the laser beams radiated from the second laser beam source section are different from each other, a dichroic mirror is used as the beam-combining optical element. Each of the common lenses of the first laser beam source section and the second laser beam source section may be constituted of a single lens. Alternatively, each of the common lenses may be constituted of a plurality of lenses insofar as the lenses are positioned so that a plurality of the laser beams radiated from the corresponding laser beam source section impinge upon the lenses, and the lenses have the lens effects common to the laser beams and are moved together with one another.

Detailed Description Text - DETX (3):

With reference to FIG. 1, a beam-combining laser beam source device 1 comprises ten semiconductor lasers 3A, 3B, 3C, 3D, 3E, 3F, 3G, 3H, 3I and 3J which are positioned in two rows and secured to an upper plate 2A of support 2 so that their axes cf laser beam emission are approximately parallel one another. Ten concave lenses 4, 4, . . . are secured to a middle plate 2B of the support 2 so that they face the semiconductor lasers 3A through 3J. Also, ten prism mirrors 5, 5, . . . acting as optical path adjusting elements are secured to a lower plate 2C of the support 2 so that they face the concave lenses 4, 4, . . . In this embodiment, a first laser beam source section 10 is constituted of the semiconductor lasers 3A through 3E, and the optical elements such as the concave lenses 4, 4, . . . and the prism mirrors 5, 5, which are positioned in the optical paths of laser beams 3a through 3e radiated from the semiconductor lasers 3A through 3E. The second laser beam source section 20 is constituted of the semiconductor lasers 3F through 3J, and the optical elements such as the concave lenses 4, 4, . . . and the prism mirrors 5, 5, . . . which are positioned in the optical paths of laser beams 3f through 3j radiated from the semiconductor lasers 3F through 3J. The elements of the first laser beam source section 10 and the elements of the second laser beam source section 20 are positioned symmetrically with respect to a wall member 2D of the support 2, wall member 2D supporting the upper plate 2A, the middle plate 2B and the lower plate 2C.

Detailed Description Text - DETX (11):

In the course of the adjustment of the positions of the laser beams 3a through 3j and the focusing of the points at which the laser beams 3a through 3j, the convex lens 11 of the first laser beam source section 10 is moved along the first direction Z so that the laser beams 3a through 3e are accurately collimated. Also, the convex lens 12 of the second laser beam source section 20 is moved along the first direction Z so that the laser beams 3f through 3j are accurately collimated. Thereafter, in order to adjust the positions of the laser beams 3a through 3j in the horizontal direction, the positions of the laser beams 3f through 3j radiated from the second laser beam source section 20 are taken as the reference, and the convex lens 11 of the first laser beam source section 10 is moved along the second direction X until the laser beams 3a through 3e radiated from the first laser beam source section 10 align the laser beams 3f through 3j. In order to adjust the positions of the laser beams 3a through 3j in the vertical direction, the positions of the laser beams 3a through 3e radiated from the first laser beam source section 10 are taken as the reference, and the convex lens 12 of the second laser beam source section 20 is moved along the second direction Y until the laser beams 3f through 3j radiated from the second laser beam source section 20 align the laser beams 3a through 3e. In order to tell whether or not the positions of the laser beams 3a through 3j and the points at which the laser beams 3a through 3j are focused have been adjusted accurately, a detection means may be provided to detect whether the laser beams 3a through 3j, which have been combined by the polarization beam splitter and which have passed through a converging lens (not shown), are converted to a predetermined spot. Alternatively, a semi-transparent mirror (not shown) may be positioned in the optical paths of the laser beams 3a through 3j, which have been combined, in order to pick up parts of the laser beams 3a through 3j as a monitor light. The monitor light is then converged, and a position sensor is used in order to detect whether or not the monitor light is converged to a predetermined position and to a predetermined spot diameter. In such cases, the adjustment of the positions of the convex lenses 11 and 12 based on the detected condition of the monitor light should preferably be carried out automatically.

Detailed Description Text - DETX (13):

Both the single common lens of the first laser beam source section and the single common lens of the second laser beam source section, whose common lenses are moved in order to adjust the positions of the laser beams, may be constituted of a concave lens. The absolute values of the focal lengths of the common lenses should preferably be larger than the absolute values of the focal lengths of the other convex lenses 6, 6, . . . and the concave lenses 4, 4, . . . of the collimator optical systems. This is because the common lenses can be moved in comparatively large distances in order to finely adjust the positions of the laser beams 3a through 3j and their condition of convergence.

In the aforesaid embodiment, each of the common lenses of the first laser beam source section and the second laser beam source section is constituted of a single lens. However, each common lens may be constituted of a plurality of lenses combined so as to have the lens effects common to the laser beams which impinge upon these lenses. In cases where the wavelengths of the laser teams radiated from the first laser beam source section and the wavelengths of the laser beams radiated from the second laser beam source section are different from each other, the beam-combining optical element which combines the laser beams radiated from the first laser beam source section with the laser beams radiated from the second laser beam source section may be constituted of a dichroic mirror, instead of the polarization beam splitter 7. Part or all of the upper plate 2A, the middle plate 2B, the lower plate 2C and the wall member 2D of the support 2 which supports the optical elements of the beam-combining laser beam source device should preferably be manufactured by an integral molding method. With the integral molding method, processing and assembly of the support 2 are facilitated, and the beam combining accuracy of the beam-combining laser beam source device can be improved because the support 2 is free of the problem caused by joined parts deviating in position due to deterioration with the passage of time.

Claims Text - CLTX (4):

(iii) optical path adjusting elements respectively positioned in the optical paths of the laser beams in order to radiate the laser beams along optical paths parallel and close to one another,

Claims Text - CLTX (6):

wherein each of said collimator optical systems of said first laser beam source section and said second laser beam source section is constituted of lens groups, each of which is composed of a plurality of lenses corresponding to each of said laser beam sources, and a common lens positioned so that the laser beams, which have been radiated from said optical path adjusting elements along the optical paths parallel and close to one another, impinge upon said common lens,

Claims Text - CLTX (11):

3. A device as defined in claim 1 wherein the wavelengths of the laser beams radiated from said first laser beam source section and the wavelengths of the laser beams radiated from said second laser beam source section are different from each other, and said beam-combining optical element is constituted of a dichroic mirror.

Claims Text - CLTX (14):

6. A device as defined in claim 1 wherein said laser beam sources, said collimator optical systems, and said optical path adjusting elements of said first laser beam source section and said second laser beam source section are supported on a single support.